Project Introduction

The Electro-Thermal Characterization of a Multi-Moded Bolometer characterize the electrical and thermal performance of large multi-moded bolometers for a new generation of far-infrared instrumentation. Multi-moded systems provide distinct advantages compared to current single-moded designs. By collecting more photons on each detector, multi-moded designs improve sensitivity by an order of magnitude. One multi-moded detector can thus replace 100 single-moded detectors, providing two orders of magnitude reduction in detector count while simplifying instrument design, integration, and testing.
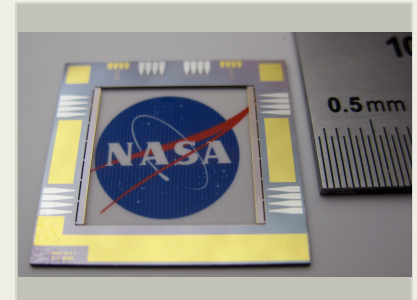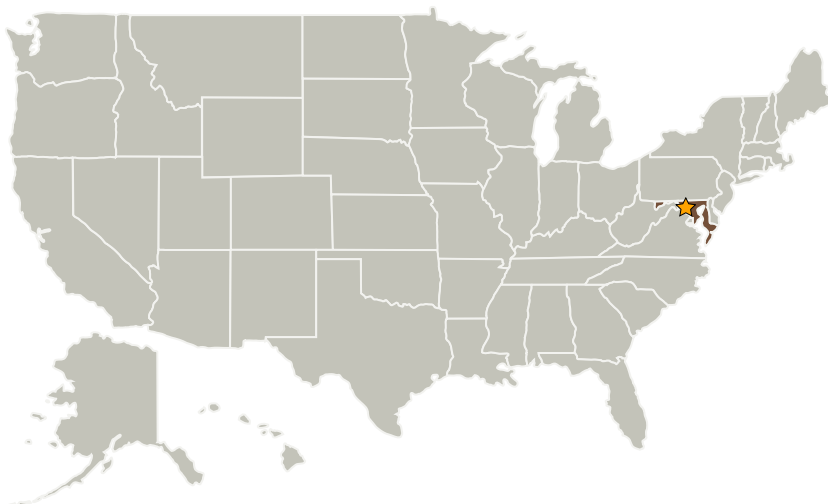
The project work will test a far-IR detector with 30 times the absorbing area as the bolometers flown on the Planck mission. Multi-moded systems provide distinct advantages compared to current single-moded designs. By collecting more photons on each detector, multi-moded designs improve sensitivity by an order of magnitude. One multi-moded detector can thus replace 100 single-moded detectors, providing two orders of magnitude reduction in detector count while simplifying instrument design, integration, and testing.

Additionally, we will extend the detector capabilities to include the much higher optical loads encountered during use in stratospheric balloon payloads.

Anticipated Benefits

By reducing the number of detectors required for photon-limited applications, the multi-moded bolometer can decrease the cost of detector and readout systems by a factor of ten or more.

Primary U.S. Work Locations and Key Partners

Pixie Detector

Table of Contents

Organizations Performing Work	Role	Type	Location
⭐Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations
Maryland

Images
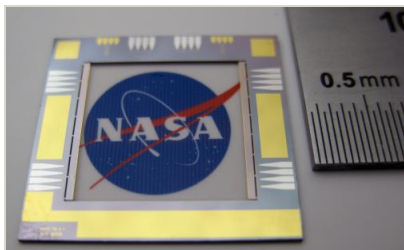
Electro-Thermal Characterization of a Multi-Moded Bolometer Project
Pixie Detector
(https://techport.nasa.gov/image/143340)

Project Website:

http://sciences.gsfc.nasa.gov/sed/

Organizational Responsibility

Responsible Mission Directorate:

Mission Support Directorate (MSD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Center Independent Research & Development: GSFC IRAD

Project Management

Program Manager:

Peter M Hughes

Project Managers:

Keith M Jahoda
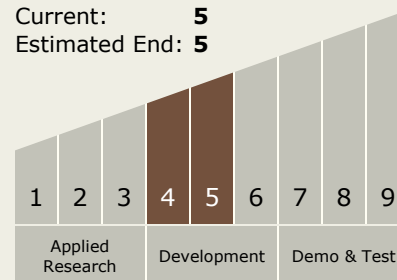David H Richardson

Principal Investigator:

Alan J Kogut

Technology Maturity (TRL)

Start: **4**
Current: **5**
Estimated End: **5**

1	2	3	4	5	6	7	8	9
Applied Research			Development			Demo & Test		

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For more information and an accessible alternative, please visit:
https://techport.nasa.gov/view/11953

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Technology Areas

Primary:

- TX08 Sensors and
  Instruments
  └ TX08.1 Remote Sensing
  Instruments/Sensors
  └ TX08.1.1 Detectors and
  Focal Planes

Target Destination
Outside the Solar System

Supported Mission Type
Projected Mission (Pull)